

CLAIMS

I/We claim:

- [c1] 1. A method for controlling the line of sight of a camera to remain fixed on a target, the camera being on a vehicle whose current position is moving at a velocity relative to a current position of the target, the method comprising:
- setting an initial line of sight for the camera that is aimed at the current position of the target;
- periodically setting an angular velocity for moving the line of sight of the camera that is calculated to compensate for the current velocity of the vehicle relative to the target;
- periodically setting the line of sight of the camera based on an adjustment angle that is calculated to compensate for a difference between a needed line of sight derived from the current position of the vehicle and the current position of the target and the current line of sight of the camera; and
- maintaining the line of sight of the camera in accordance with the set angular velocity and set line of sight as the attitude of the vehicle changes relative to the current position of the target.
- [c2] 2. The method of claim 1 wherein the target is at a fixed position.
- [c3] 3. The method of claim 1 wherein the vehicle is airborne.
- [c4] 4. The method of claim 1 wherein the initial line of sight of the camera is set based on an operator centering the line of sight of the camera on the target.
- [c5] 5. The method of claim 4 including calculating the current position of the target based on the current position of the vehicle and altitude of the target.

- [c6] 6. The method of claim 1 wherein the initial line of sight of the camera is set based on the current position of the target and the current position and attitude of the vehicle.
- [c7] 7. The method of claim 7 wherein the attitude includes pitch, roll, and heading.
- [c8] 8. The method of claim 1 wherein a gyroscope is used to maintain the line of sight of the camera.
- [c9] 9. A method for controlling the orientation of a device to remain fixed on a target, the device being on a vehicle that is moving at a velocity relative to a current position of the target, the method comprising:
- setting an initial orientation for the device that is aimed at the current position of the target;
 - periodically setting a velocity for moving the orientation of the device that is calculated to compensate for the current velocity of the vehicle relative to the target;
 - periodically setting the orientation of the device that is calculated based on the current position of the device and the current position of the target; and
 - maintaining the orientation of the device in accordance with the set velocity and set orientation as the attitude of the vehicle changes relative to the current position of the target.
- [c10] 10. The method of claim 9 wherein the target is at a fixed position.
- [c11] 11. The method of claim 9 wherein the device is a camera.
- [c12] 12. The method of claim 9 wherein the vehicle is airborne.

- [c13] 13. The method of claim 9 wherein the vehicle is land based.
- [c14] 14. The method of claim 9 wherein the initial orientation of the device is set based on an operator centering the orientation of the device on the target.
- [c15] 15. The method of claim 14 including calculating the current position of the target based on the current position of the vehicle and difference in altitude between the current position of the vehicle and current position of the target.
- [c16] 16. The method of claim 9 wherein the initial orientation of the device is set based on the current position of the target and the current position and attitude of the vehicle.
- [c17] 17. The method of claim 9 wherein a gyroscope is used to maintain the orientation of the device as the vehicle maneuvers.
- [c18] 18. A system for controlling the orientation of a device to remain fixed on a target, the device being on a vehicle that is moving relative to a target, comprising:
- a component that sets an initial orientation for the device so that the device is aimed at the target;
 - a component that periodically establishes an adjustment rate for moving the orientation of the device during the period that is calculated to compensate for the velocity of the vehicle relative to the target;
 - a component that periodically establishes a new orientation for the device that is calculated based on a current position of the device and a current position of the target; and
 - a component that maintains the orientation of the device in accordance with the established adjustment rate and established orientation as the vehicle maneuvers.

- [c19] 19. The system of claim 18 wherein the target is moving.
- [c20] 20. The system of claim 18 wherein the device is a camera.
- [c21] 21. The system of claim 18 wherein the vehicle is airborne.
- [c22] 22. The system of claim 18 wherein the vehicle is space based.
- [c23] 23. The system of claim 18 wherein the initial orientation of the device is set based on an operator centering the orientation of the device on the target.
- [c24] 24. The system of claim 23 including calculating an initial position of the target based on an initial position of the vehicle and an initial difference in altitude between the vehicle and the target.
- [c25] 25. The system of claim 18 wherein the initial orientation of the device is set based on the current position of the target and the current position of the vehicle.
- [c26] 26. The system of claim 18 wherein a gyroscope is used to maintain the orientation of the device as the vehicle maneuvers.
- [c27] 27. The system of claim 18 wherein the adjustment rate is angular velocity of a gimbal on which the device is mounted.
- [c28] 28. A method for keeping a device locked on a target, the device being on a vehicle and being initially oriented towards the target, the method comprising:
 dynamically adjusting the orientation of the device based on calculations to compensate for a velocity of the vehicle relative to the target;

statically adjusting the orientation of the device that is calculated based on
a current position of the device and a current position of the target;
and
maintaining the orientation of the device in accordance with the dynamic
and static adjustments as the vehicle maneuvers.

[c29] 29. The method of claim 28 wherein the calculation for the dynamic
adjustment is performed at a time interval.

[c30] 30. The method of claim 29 wherein the dynamic adjustment is an
adjustment rate that is applied continuously during the time interval.

[c31] 31. The method of claim 28 wherein the calculation for the static
adjustment is performed at a time interval.

[c32] 32. The method of claim 31 wherein the orientation is statically adjusted
once a time interval.